

CLAIMS

What is claimed is:

1. A liquid crystal display device comprising:
a liquid crystal layer having a twist angle (ϕ) of about 60° to about 90° ;
a polarizer positioned to receive light from a light source and to polarize said light, said polarizer polarizing said light such that an angle β exists between a vector of said polarized light and a first alignment direction of said liquid crystal layer;
wherein β is in a range of about -13° to about $+13^\circ$ and wherein a value of Δn is about $0.1\mu\text{m}$ to about $0.2\mu\text{m}$ where Δn is a birefringence of the liquid crystal layer and d is a thickness of the liquid crystal layer.
2. A liquid crystal display device as in claim 1 further comprising:
a first substrate coupled to said liquid crystal layer;
a second substrate coupled to said liquid crystal layer, said first substrate and said second substrate defining said thickness d .
3. A liquid crystal display device as in claim 2 wherein said second substrate comprises a reflective surface.
4. A liquid crystal display device as in claim 3 wherein said reflective surface comprises a plurality of reflective pixel electrodes disposed on said second substrate.

5. A liquid crystal display device as in claim 4 wherein said second substrate comprises an integrated circuit.
6. A liquid crystal display device as in claim 2 wherein said first substrate is transparent and comprises a transparent electrode.
7. A liquid crystal display device as in claim 6 wherein a first alignment layer is created on said first substrate, said first alignment layer determining said first alignment direction and wherein a second alignment layer is created on said second substrate, said second alignment layer determining a second alignment direction and wherein said twist angle is determined by the angle between said first alignment direction and said second alignment direction.
8. A liquid crystal display device as in claim 7 wherein said polarizer is a polarizing beamsplitter.
9. A liquid crystal display device as in claim 2 wherein said light source is a field sequential light source which separately provides a plurality of different colored light over time which correspond to separate color fields.

10. A liquid crystal display device as in claim 9 wherein said light source comprises 3 differently colored LEDs (light emitting diodes) which are sequentially and separately turned on.
11. A liquid crystal display device as in claim 2 further comprising:
at least one lens positioned to receive modulated light from said liquid
crystallayer.
12. A liquid crystal display device as in claim 11 wherein said liquid crystal display device is housed within a head mounted display.
13. A liquid crystal display device as in claim 9 wherein each separate color field of said separate color fields lasts for no longer than about 8 milliseconds.
14. A liquid crystal display device as in claim 2 wherein said twist angle is about 80° and said β is in a range of about -5° to about $+5^\circ$ and said Δn is in a range of about $0.13\mu\text{m}$ to about $0.17\mu\text{m}$.